PATENT
Docket No. 146712002600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Li-Lien LEE et al.

Serial No.: 09/964,690

Filing Date: September 28, 2001

For: NIOBIUM ALLOY SEEDLAYER FOR MAGNETIC RECORDING MEDIA

Examiner: Holly C. Rickman

Group Art Unit: 1773

DECLARATION OF DR. LI-LIEN LEE UNDER 37 CFR 1.132

Commissioner for Patents
Washington, D.C. 20231

Sir:

Li-Lien Lee declares under penalty of perjury under the laws of the United States of America as follows:

1. I received a Ph.D. from Carnegie Mellon University in 1997. At Carnegie Mellon University, I did research the area magnetic recording media for my Ph.D. thesis. Subsequently, I worked at Intermac, which makes the sputtering equipment used for deposition of the layers of a magnetic recording medium. Currently, I am a Scientist in Seagate Recording Media Operations.

2. I am the first named inventor on the pending application. I study magnetic materials used in a variety of applications, such as recording media and heads, magneto-optical devices, and sensors. I also study the fabrication of magnetic films and small structures using sputtering and measuring the magnetic behavior of the resulting films. I am very familiar with the art relating to magnetic recording media. Based on my experience, I consider myself to be a person of skilled in the art of magnetic recording media.

3. Based on my experience at Intervac, I know that the accuracy of deposition a non-magnetic material such as Cr by a sputtering process is about 4-6%. This assertion is further

supported by the disclosure on page 16 of Acceptance Test Procedure (ATP) for MDP-250B sputtering machine manufactured by Intervac.

4. In the Action of August 28, 2003, the Examiner stated that the data on sputtering accuracy for a Cr-layer is not applicable to the presently claimed film having a niobium-containing seedlayer. Therefore, I deposited multiple niobium-containing seedlayers having thicknesses of about 125Å and 150Å in accordance with the procedure on page 16, lines 9-18, of the specification and measured the thicknesses of these seedlayers. The deposition rate for the above Nb films was 0.0625 Å/W-s. The results of my testing are shown below.

Niobium films sputter with a CM gun (16 sccm Ar + 4 sccm O_2)

Experiment #: F308149

Sample	Sputter condition (W-s)	Film thickness, Å	Average, Å	Stdev, Å
S10-1	2400	150.8	149.7	3.6
S10-2	2400	151.2		
S10-3	2400	154.5		
S10-4	2400	145.6		
S10-5	2400	146.6		
S12-1	2000	120.6	125.7	3.5
S12-2	2000	123.5		
S12-3	2000	128.6		
S12-4	2000	127.7		
S12-5	2000	128.2		

*Film thicknesses are measured by x-ray reflectivity technique (XRR).

5. The above results prove the following:

(a) The standard deviation of the sputtered Nb film thickness is ~3.5 Å or less.

(b) The thickness uniformity for Nb films of about 125Å and 150Å are ±3.2% and ±3%, respectively.[1]

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Executed at Fremont, California, United Stated of America, this 14th day of October, 2003.

Li-Lien Lee

Li-Lien Lee

[1] Thickness uniformity is defined as the ratio of difference of the maximum and minimum thicknesses over sum of the maximum and minimum thicknesses, i.e., $(T_{max}-T_{min})/(T_{max}+T_{min})$.